KİMETSAN
Aerospace and Defence Coatings Ltd

A Proven Aerospace Waterborne Coating Technology

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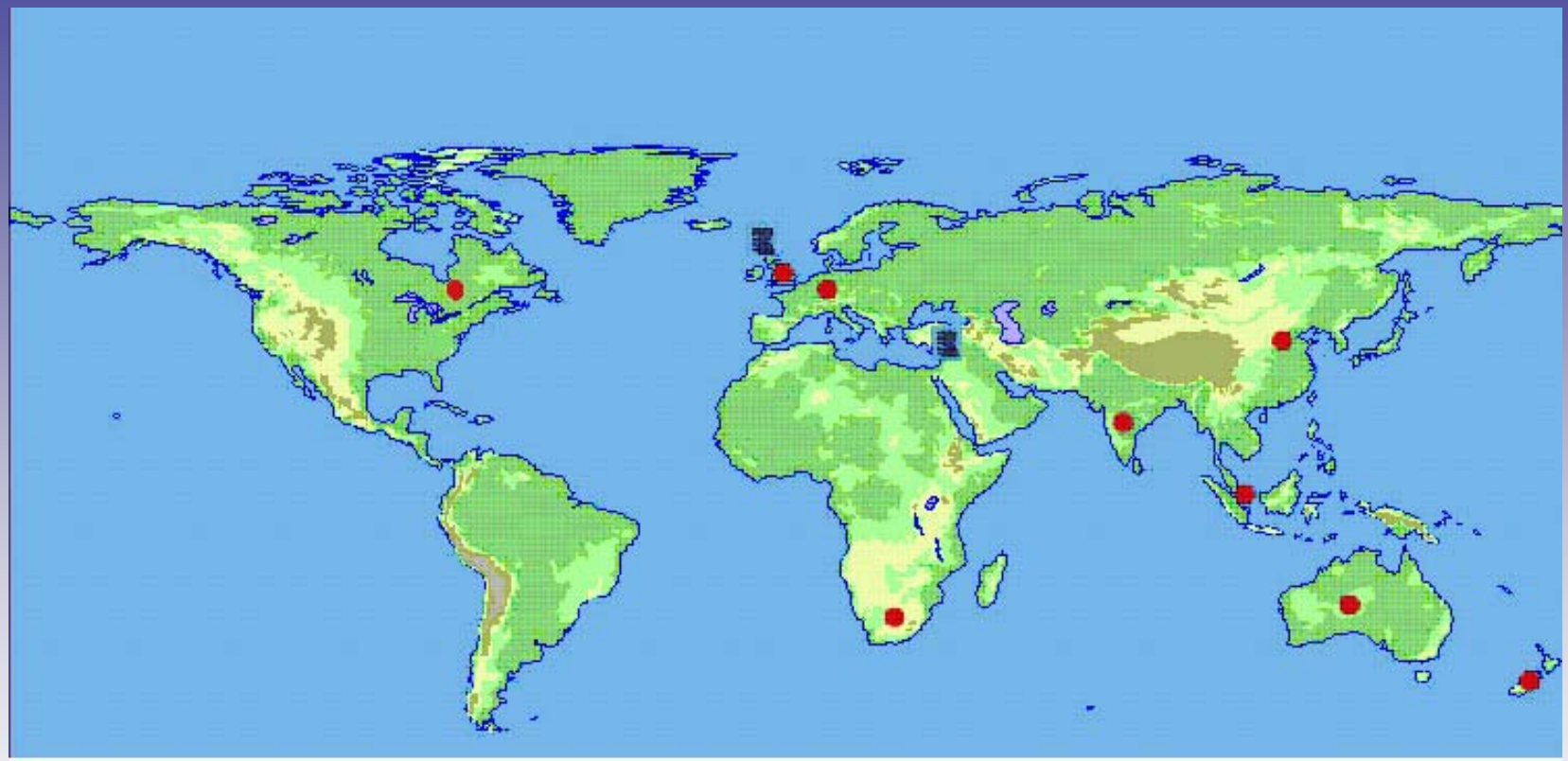
KİMETSAN ACTİVİTİES OVER THE WORLD



KIMETSAN GROUP COMPANIES

- **ACTIVITIES**

INTRODUCTION TO A TOTAL SYSTEM

A True Waterborne Coating	D45-AMS
A Surface Preparation Solution	SPS
A Coating Removal System	CRS

D45-AMS. CONSTRUCTION

Acrylic Modified Polyurethane

Combined with

Oxygen Activated Polyurethane Resin

D45-AMS. THE TRUE WATERBORNE

No HAPS

No Chromates

No Isocyanurates

No Toxic Chemicals

VOCs < 120g/litre & Reducing

BANNED CHEMICALS FOR AEROSPACE AND WEAPON SYSTEMS

- System will not contain banned materials
- Threshold value is 0.1% by the weight of the material (not of the article) for carcinogens and 1% for non-carcigonens

Iron Carbonyl

Pentachlorophenol

Class 1 Ozone Depleting Compounds

2,4,5-Trichlorophenoxyacetic Acid

2,4-Dichlorophenoxyacetic Acid

Nickel Carbonyl

Trichloroethylene(TCE)

1,1,1-Trichloroethane(TCA)

Asbestos

Tetrachloremethane

4,4-Methylenedianiline (MDA)

Polychlorinated Biphenyls (PCB)

Picric Acid (2,4,6- Trinitrophenol)

RESTRICTED CHEMICALS FOR AEROSPACE AND WEAPON SYSTEMS

- Threshold value is 0.1% by the weight of the material (not of the article) for carcinogens and 1% for non-carcigonens

Corrosive Materials

Methylene Chloride

Anhydrous ammonia

Beryllium and Compounds

Phenol

Toluene Disosocyanate

Oxiders

Chrome and Compounds

Depleted Uranium

Formaldehyde (methyle glycol)

Xylenes

Hydrazine

Radioactive Materials

Inorganic Compounds

Explosive Materials

Cadmium and Compounds

Methyl Isobutyl Ketone (MIBK)

Benzene

Nickel and Compounds

Sulfur Dioxide Gas

Perchloroethylene(Tetrachloroethylene)

Class 2 Ozone Depleting Compounds

Chlorine Gas

Nitric Acid

Toluene

>70%Hydrofluoric Acid

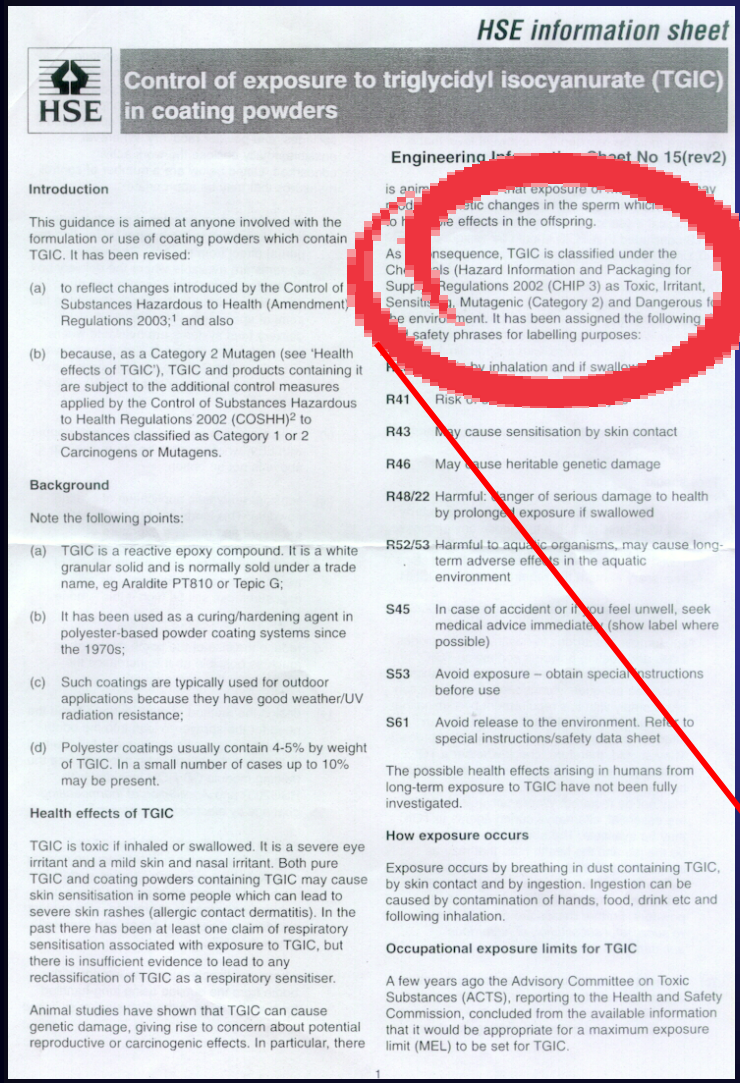
Methyl Ethyl Ketone(MEK)

Lead Compounds

Mercury (attrit)

Methanol

Control of exposure to triglycidyl isocyanurate (TGIC) in coating powders



HSE information sheet

Control of exposure to triglycidyl isocyanurate (TGIC) in coating powders

Engineering Information Sheet No 15(rev2)

Introduction

This guidance is aimed at anyone involved with the formulation or use of coating powders which contain TGIC. It has been revised:

(a) to reflect changes introduced by the Control of Substances Hazardous to Health (Amendment) Regulations 2003;[1] and also

(b) because, as a Category 2 Mutagen (see 'Health effects of TGIC'), TGIC and products containing it are subject to the additional control measures applied by the Control of Substances Hazardous to Health Regulations 2002 (COSHH)[2] to substances classified as Category 1 or 2 Carcinogens or Mutagens.

Background

Note the following points:

(a) TGIC is a reactive epoxy compound. It is a white granular solid and is normally sold under a trade name, eg Araldite PT810 or Tepic G;

(b) It has been used as a curing/hardening agent in polyester-based powder coating systems since the 1970s;

(c) Such coatings are typically used for outdoor applications because they have good weather/UV radiation resistance;

(d) Polyester coatings usually contain 4-5% by weight of TGIC. In a small number of cases up to 10% may be present.

Health effects of TGIC

TGIC is toxic if inhaled or swallowed. It is a severe eye irritant and a mild skin and nasal irritant. Both pure TGIC and coating powders containing TGIC may cause skin sensitisation in some people which can lead to severe skin rashes (allergic contact dermatitis). In the past there has been at least one claim of respiratory sensitisation associated with exposure to TGIC, but there is insufficient evidence to lead to any reclassification of TGIC as a respiratory sensitiser.

Animal studies have shown that TGIC can cause genetic damage, giving rise to concern about potential reproductive or carcinogenic effects. In particular, there is anim[illegible] that exposure [illegible] may [illegible] genetic changes in the sperm which [illegible] to [illegible] effects in the offspring.

As [illegible] consequence, TGIC is classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP 3) as Toxic, Irritant, Sensitising, Mutagenic (Category 2) and Dangerous for the environment. It has been assigned the following risk and safety phrases for labelling purposes:

R[illegible]	[illegible] by inhalation and if swallow[illegible]
R41	Risk [illegible]
R43	May cause sensitisation by skin contact
R46	May cause heritable genetic damage
R48/22	Harmful: danger of serious damage to health by prolonged exposure if swallowed
R52/53	Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment
S45	In case of accident or if you feel unwell, seek medical advice immediately (show label where possible)
S53	Avoid exposure – obtain special instructions before use
S61	Avoid release to the environment. Refer to special instructions/safety data sheet

The possible health effects arising in humans from long-term exposure to TGIC have not been fully investigated.

How exposure occurs

Exposure occurs by breathing in dust containing TGIC, by skin contact and by ingestion. Ingestion can be caused by contamination of hands, food, drink etc and following inhalation.

Occupational exposure limits for TGIC

A few years ago the Advisory Committee on Toxic Substances (ACTS), reporting to the Health and Safety Commission, concluded from the available information that it would be appropriate for a maximum exposure limit (MEL) to be set for TGIC.

1

As a consequence, TGIC is classified under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP 3) as Toxic, Irritant, Sensitising, Mutagenic (Category 2) and Dangerous for the environment. It has been assigned the following risk and safety phrases for labelling purposes:

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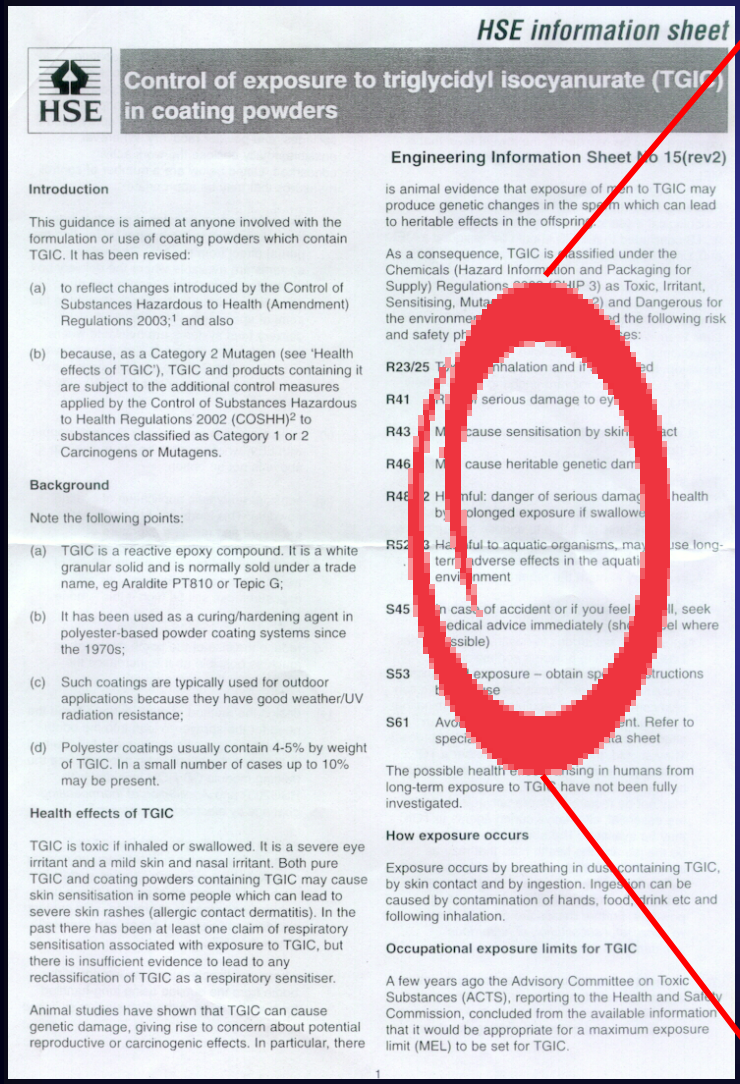

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Animal studies have shown that TGIC can cause genetic damage, giving rise to concern about potential reproductive or carcinogenic effects. In particular, there is animal evidence that exposure of men to TGIC may produce genetic changes in the sperm which can lead to heritable effects in the offspring.

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R23/25 Toxic by inhalation and if swallowed

R41 Risk of serious damage to eyes

R43 May cause sensitisation by skin contact

R46 May cause heritable genetic damage

R48/22 Harmful: danger of serious damage to health by prolonged exposure if swallowed

R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

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D45-AMS IS VERSATILE

Primer

Top Coat (Self Priming)

Corrosion Resistant Primer D45-AMS MO

Corrosion Resistant Self Priming Top Coat

APPLICATION

Dry to Tape in Minutes

Low Pressure delivery circa 3 psi

Dry Film Weight 50% Lighter than High Solids

Recommended Dry Film Thickness 60 microns

Less than 5% Over-spray and No Bounce Back

SUBSTRATES

U-PVC

Titanium

Aluminium

Composites

Magnesium Alloys

Internal and External Situations

FLUID IMMERSION RESISTANCE

Solvents

De-icing Fluids

Lubricating Oils

Hydraulic Fluids

Skydrol® 5, LD-4, 500B-4

Jet / Petroleum / Diesel Fuels

MECHANICAL ASSETS

Flexible

Marr Resistant

Crack – Impact Resistant

Bend and Twist Resistant

Very High Co-efficient of Linear Expansion

STANDARD FEATURES

Rain Erosion Resistant

Antistatic -- Anti Microbial

UV and Acid Rain Resistant

Chemical Agent Resistant (C.A.R.C.)

Continuous High / Low Temperature Resistance

MORE STANDARD FEATURES

Fire Resistant

Proven Longevity

Hydrophilic – does not leach moisture

Hydrolytically Stable when immersed in Fluids

SPECIALIST OPTIONS

Thermo Chromic

Conductive Inter Coat

Non Conductive Coating

Aerospace Walkway Coating

Low Infrared and Solar Reflecting C.A.R.C.

AEROSPACE APPLICATIONS

Satellites

Radars **Radomes**

Civil **Military** **Aircraft**

Missiles **Ordnance** **Rockets**

APPLICATIONS BASED ON D45-AMS TECHNOLOGY

Buildings

Runway Markings

Concrete Hanger Floors

Aluminium and PVC Coloring

Composite Material Coloring

Airfield Service Vehicles and Equipment

Armoured Tactical and Support Vehicles

Terrestrial / Offshore Installations and Vessels

The commercial advantages – Environmental

The principal advantages of reducing HAPS and VOCs in this range of aerospace and defense coatings to below 120g/l and the elimination of toxic and carcinogenic substances including Isocynarutes, Fluorine and Chromates are:

- **Dispense with the need to develop and implement environmental strategies.**
- **Eliminates much of the cost of maintaining related environmental permits.**
- **Eliminates the creation and the expense of processing hazardous waste.**
- **Fewer waste handling, storage and disposal costs.**
- **Eliminates the requirement to use hazardous materials.**
- **Lower employer liability insurance premiums due enhanced worker safety.**
- **Significantly reduces the use of ozone depleting substances.**
- **Reduced dependence on non-renewable natural resources.**
- **Eliminates the difficulty of budgeting for the variable costs of organic, (crude oil), derived products.**

The commercial advantages – Environmental (continue)

- Ecologically sound water transfer medium does not pollute the atmosphere of damage the ozone layer.
- Reduces the need to develop and administer safety programs.
- Products are odorless do not cause public offence.
- Fewer man-hours lost through labor sickness.
- Eliminates organic solvents from clean up operations.
- Dispenses with the need for dedicated paints shops and their associated operating costs.
- Eliminates the need to construct additional paint shops located at aerospace manufacturing and rework facilities, due to faster turnarounds.
- Eliminates the need to transfer aircraft from ‘green’ states for (re) painting with the associated non-productive positioning costs, ‘down’ time and loss of revenue incurred.
- Designed for maximum ‘slip’ resulting in less drag, lower NOx emissions and associated proposed tax penalties.
- Efficiently cleaned with mild detergent and warm water, reduces energy costs.
- Constructers and owners can promote the implementation of environmentally friendly solutions incorporated in their products.

The commercial advantages – Environmental (continue)

- Free of any components listed under EPA-17.
- All products comply by at least a 50% margin below the lowest MACT for CalifornianSCAQMD Rule 1124 VOC emission limitations for Aerospace Assembly and Component Manufacturing operations in anticipation of future environmental legislation.
- The elimination of solvents for degreasing, preparation and painting operations reduces the likelihood of reaching the reporting thresholds defined by SARA III.
- These products are not reportable under: California Proposition 65; Community Right to Know List; EPA Genetic Toxicology Program; ACGIH TVL; EPA TSCA; OSHA PEL; SARA Sections 302 & 313.
- The holders of FAA Part 135 certificates may not need to set up atn FAA training program for handling these materials under the pending mandatory Hazmat Proposal.

*Clear coat is the exception where the VOC content is still below 120 g/l.

How reduction in VOCs emitted by Kimetsan Aerospace **D45-AMS** coatings compare with those listed in Aerospace Assembly and Component Manufacturing Operations Rule 1124, January 2003 limitations.

Coating	1-1-03	D45 AMS	% VOC emitted
Chemical Agent Resistant	220gm/litre	<120gm/litre	83% less
Non Slip Walkway	340gm/litre	<120gm/litre	183% less
Low Anti Infrared Reflectant	340gm/litre	<120gm/litre	183% less
Primer – Internal / External*	350gm/litre	<120gm/litre	192% less
Top Coat	420gm/litre	<120gm/litre	250% less
Impact Resistant	420gm/litre	<120gm/litre	250% less
Clear Top Coat	520gm/litre	<120gm/litre	333% less
Fire Resistant - Civilian	650gm/litre	<120gm/litre	442% less
Wing Coating	700gm/litre	<120gm/litre	483% less
Touch up Coating	750gm/litre	<120gm/litre	525% less
Erosion Resistant	800gm/litre	<120gm/litre	567% less
Missiles or Single Use Target Craft	840gm/litre	<120gm/litre	600% less
Primer Compatible with Rain Erosion Resistant Coating	850gm/litre	<120gm/litre	608% less
Fire Resistant - Military	970gm/litre	<120gm/litre	708% less
Electrostatic Discharge Protection	1000gm/litre	<120gm/litre	733% less

Amended. US EPA 40 CFR Part 63.745(c) (1) & (2) enabled the VOC content MACT (Maximum Achievable Control Technology), for external primers to be rolled back from 350g/l, to pre Montreal Protocol, 650g/l.

These points illustrate how performance can promote the investment.

- Paint drying and dry to tape times is measure din minutes – not hours.
- Better returns on investment both in labor, equipment and material.
- Significantly increased production and through put. Turnaround times less halved.
- Downtime incure changing livery more than halved.
- Spray application down to 1½ psi reduces bounce back and over spray to less than 5% enabling very high transfer efficiency and minimal material waste.
- Low-pressure AccuSpray® technology closes the gap between theoretical and actual coverage to less than 5%. Eliminates the need for water walls.
- Antistatic and hydrophilic properties reduce maintenance, parasitic drag and retain corporate image fresher longer.
- Antistatic properties have significantly reduced static related explosions in missile assembly plants.

These points illustrate how performance can promote the investment. (continue)

- Antistatic properties could significantly reduce static build up responsible for up to 60% of onboard electronic malfunctions.
- Antistatic properties deny dust build up on internal panels. Dust can constitute a combustible fire hazard acting as fuel in the ‘fire triangle’ (Heat, Fuel and Oxygen)
- Exceptional flexibility enables coatings to resist mechanical and thermal shock, distortion, expansion and contraction.
- Hydrophilic properties eliminate moisture being leached after curing. (Moisture in camera bays can mist up satellite camera lenses).
- Excellent UV, acid rain and hydrolytic stability that enables enhanced longevity.

These points illustrate how performance can promote the investment. (continue)

- Wide range of thermal shock tolerance, continuous expansion and
- contraction from -130 ºC to +200 ºC (-202 ºF to +392 ºF).
- Products resistant to Skydrol® 5, LD-4, 500B-4 and mixed combinations.
- Clear coats that do not ‘yellow’ with age.
- Adhesion characteristics and additives protect substrates from corroding without the use of chromates.
- Corrosion inhibitors incorporated.

BEST OF ALL, ‘IT’S FREE!’

What you pay for using Traditional, High Solid Coatings :

Thicker Dry Film	**=**	**70+ %**
Wastage from Overspray & Bounce back	**=**	**25+ %**
Legal and Environmental Liabilities	**=**	**5+ + %**
Total Additional Cost Incurred	**=**	**100+ + %**

COMPLEMENTARY AEROSPACE PRODUCTS BY KIMETSAN GROUP

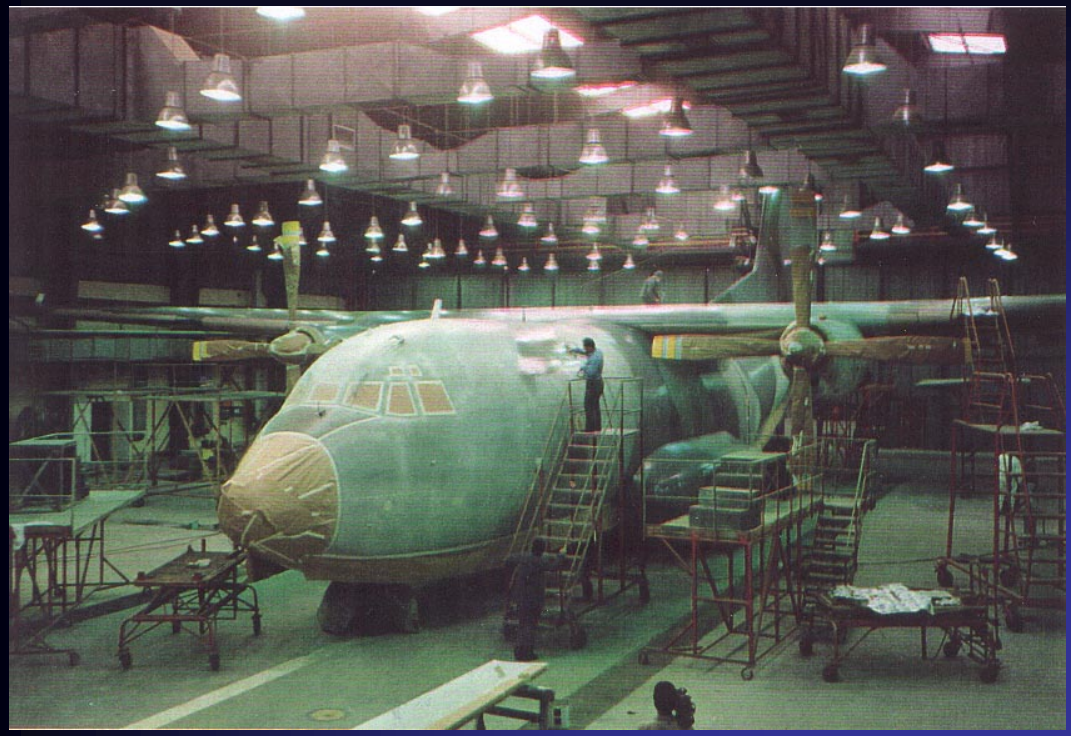
De-icing Fluids

Heat Transfer Fluids

Pure Corrosion Inhibitors

Corrosion Inhibitors in Solution

Multi Metal Vapour Phase Corrosion Inhibitors



KIMETSAN AEROSPACE

Waterborne Industrial Coatings

C-160 Military Transport Aircraft Application

KIMETSAN AEROSPACE

Waterborne Industrial Coatings Military

Jet Aircraft Radomme Application

Rocket and Rocket Launcher Applications

RAF FARNBOROUGH Sir Frank Whittle Trust

Before…

After…

Kimetsan

“Exceeding

Aerospace and Defence Industry

Expectations”